AN INVESTIGATION OF SELECTED LANGUAGE PERFORMANCE IN ADULT SCHIZOPHRENIC SUBJECTS

By

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (CONTINUED)

LIST OF FIGURES

Abstract of Dissertation Presented to the Graduate Council of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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There are confusing similarities in the aberrant speech and language performance of patients with brain damage, such as aphasia, and patients with schizophrenia. Due to the bizarre communicative impairment and behavioral changes observed in each of these two groups, it is not unreasonable to expect that differential diagnosis in terms of language performance patterns may not be an easy task for the speech pathologist.

Differential diagnosis between communicative dysfunction due to brain damage and that which is manifested in schizophrenia, in terms of diagnostic tools normally part of the speech clinician's armamentarium, has not been discussed in the literature. Most of the previous research has been concerned with psychological tests.

The present study measured selected language performance in adult schizophrenic subjects and attempted to differentiate the pattern of language performance of this experimental group from that of a group of brain-injured subjects.

The experimental group was composed of 23 adults who had been medically diagnosed as schizophrenic and who were undergoing treatment at the Veterans Administration Hospital, Gainesville, Florida. The Porch Index of Communicative Ability and the modified 40-item Token Test were administered to the experimental group to measure levels of speech and language performance. Test stability was investigated by retesting during the second week subsequent to the date of testing. The control group was composed of 150 adults who had sustained brain injury and who represented a range of different degrees of speech and language dysfunction.

The performance levels of the schizophrenic group and the brain-injured group were compared on the basis of the PICA subtests, overall means, and means for the three response modalities, gestural, verbal, and graphic. The results of statistical tests revealed that the experimental and control subjects differed significantly on 20 of the 22 variables measured. The general performance level of schizophrenics was higher than that of brain-injured

subjects on the PICA battery. When the relationships among PICA subtests were examined for both groups, a re-ordering of the hierarchy of difficulty was observed for the schizophrenic group. The data revealed that there was a reversal of the relationships of the means for the gestural and verbal response modalities between the experimental and control groups. This finding indicated that schizophrenics perform better on verbal response tasks; whereas, aphasics perform at a higher mean level on gestural tasks. Both groups experienced the greatest difficulty with graphic response subtests.

Correlation coefficients were computed to ascertain interrelationships among the 28 variables yielded by response level scores of the schizophrenic group. Many variables were shown to be highly correlated.

Stability of the test scores in the experimental group was examined by using test-retest procedures. Performance levels between the two test sessions were found to be highly correlated.

The results of the study indicated that the instruments used to measure language performance may be of value in making a differential diagnosis between communicative dysfunction due to brain injury, such as aphasia, and that manifested in schizophrenia. The findings must be

considered applicable only to subjects who are similar to the ones in this sample. The findings may or may not be applicable to the entire schizophrenic population.

CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Statement of the Problem

The speech pathologist who includes in his caseload the evaluation and rehabilitation of the individual who has speech and language impairment which is the result of brain damage is occasionally presented with the problem of the communicative disorders in schizophrenia. There are many confusing similarities in the behavioral changes observed in patients with brain lesions and in schizophrenic patients, such as bizarre speech and language, ambivalence, confusion, agitation and anger, euphoria, and paranoia (Arieti, 1959; Benton, 1970). To compound the problem, Darley (1970) states,

> . . . patients with diffuse cerebral disease who display generalized intellectual impairment also demonstrate language impairment which may resemble aphasia: at least mild across-the-board language difficulty; mild auditory retention difficulty; and slowness, vagueness, and unsureness of response. Their attention wanders and they forget what they were doing or talking about or how they were supposed to respond. They express feelings of inadequacy and bewilderment without being

> aware of specific errors they have made. They display increased difficulty on more abstract tasks. (p. 47)

The preceding difficulties of patients with diffuse brain damage, as outlined by Darley, are also to be observed in schizophrenia (Kolb, 1968, p. 363). In view of this, it is reasonable to expect that differential diagnosis between communicative dysfunction due to brain damage, such as aphasia, and that which is manifested in schizophrenia, is not an easy task for the speech clinician. In fact, Rumke and Nijam (1968), according to Critchley (1970, p. 354), asked "Might the secret of schizophrenia . . . lie in a hitherto unknown high-level aphasic disturbance?" The speech pathologist must be able to differentiate between these disorders if he is to properly plan a program of speech and language rehabilitation. Each type of disorder, while presenting characteristics of speech and language impairment different from those found in the other disorder, also presents symptoms which are similar. This results in difficulty when a diagnostic speech and language evaluation is attempted. The communicative behavior of both types of patient often demonstrates the use of neologisms and jargon speech, while perseveration and repetition have been observed in the verbal, gestural, and graphic responses of individuals of both groups (Critchley, 1970). Similarly,

impairment in the ability to abstract and a tendency to speak in concrete terms are common characteristics of the communication disorders presented by both types of patients (Schuell, Jenkins, and Jiminez-Pabon, 1964; Goldstein, 1959; Arieti, 1971).

Conversely, the language abnormalities associated with schizophrenia which are not presented bythe aphasic patient include impulsive hyperverbalization in which the patient talks but communicates little to his listener. In this instance, the presence of a listener seems to serve only as a stimulus to speech activity, rather than as a reason to say something. Schizophrenics often use words and sentences which are not meaningful to the normal listener. While the language of schizophrenics may have a formal structure, it often accomplishes little in terms of interpersonal communication. This abnormal language behavior is often related to profound thought disorder. Seeman (1970) reports in her review of the language of schizophrenia that there is evidence of the use of constricted vocabulary and that schizophrenics prefer action words, verbs, to descriptive words, adjectives. The use of the pronoun 'I' is more frequently used (Critchley, 1964; 1970). In addition, overconcern with detail and compulsive concerns have been reported (Fust, 1972). For example, a schizophrenic patient

when asked only to name a pen might describe it as "This is a pen, some people call it a fountain pen or an ink pen and you can make notes on things. You know, when I read I make notes in the margins; sometimes I use a pencil, though. This is a very nice pen, it looks expensive. Wonder if it has ink in it?"

The characteristics of speech and language behavior associated with schizophrenia have been observed and reported in a number of instances in patients referred for evaluation of communication disorders due to 'brain damage.' During the administration of a standardized diagnostic battery, the Porch Index of Communicative Ability (PICA), it was found that, in some instances, patients performed poorer on the tasks which are ranked as being less difficult for brain-damaged individuals while, conversely, performed better than aphasics on the more difficult tasks (Fust, 1972; Porch, 1967). The performance of these patients who were at first tentatively identified as 'brain-damaged' but who were subsequently diagnosed as being schizophrenic resulted in an aberrant pattern of PICA Modality Response Summary and Ranked Response Summary profiles which does not conform to one of the four patterns associated with the responses of brain-damaged subjects classified as 'aphasic.'

In view of this, Porch (1971) has suggested that brain-damaged subjects and schizophrenic subjects can be distinguished by such aberrant patterns on the ranked response profile which is yielded by speech and language performance on the 18 subtests which comprise the PICA. However, to date, there has not been a controlled study to investigate or substantiate this clinical impression.

Review of the Literature

Terminology

When the term schizophrenia was introduced by Bleuler in 1911, he referred to a splitting of the mental processes and, further, he felt that the disorder could become static at any stage and that periods of partial or total remission could occur. Dorland's Illustrated Medical Dictionary (1965) advises that schizophrenia is "Bleuler's term for dementia praecox which, according to his interpretation, represents a cleavage or fissuration of the mental functions" (p. 1350).

Webster's Third New International Dictionary states that schizophrenia is a noun derived from the New Latin schizo meaning split, cleft, or divided, and the Greek word phren which means heart, mind. The term schizophrenia is defined as:

> A psychotic disorder of unknown complex etiology that occurs as simple, paranoid, catatonic, or

> hebephrenic, is characterized by disturbance in thinking involving a distortion of the usual logical relations between ideas, a separation between the intellect and the emotions so that the patient's feelings or their manifestations seem inappropriate to his life situation, and a reduced tolerance for the stress of interpersonal relations so that the patient retreats from social intercourse into his own fantasy life and commonly into delusions and hallucinations, and may when untreated or unsuccessfully treated go on to marked deterioration or regression in the patient's behavior though often unaccompanied by further intellectual loss. (1967, p. 2030)

Redlich and Freedman (1966, p. 459) state that there is no generally accepted definition of schizophrenia, and they suggest that points of view vary widely. They advise that the second volume of references by Bellack (1958) lists 4,000 articles and books on schizophrenia that were published between 1946 and 1956 and, that in spite of these works "the important questions of diagnosis, prognosis, etiology, and therapy are still unanswered and constitute psychiatry's greatest challenge" (Redlich and Freedman, 1966, p. 459). According to Cameron (1963, p. 577), fifteen thousand professional articles and books have been written about schizophrenia.

Bleuler (1950), in presenting a historical background of the disorder, states that prior to general acceptance of the term schizophrenia, several other terms had been suggested by Europeans, but none was adopted. The term

dementia praecox coined by the Belgian psychiatrist Morel, in 1860 was subsequently used by the German, Emil Kraepelin, in 1896 to refer to a group of deteriorating psychoses which included at first the hebephrenias and 'dementing' (deteriorating) syndromes. Then, some three years later, Kraepelin included catatonia and paranoia under the term dementia praecox.

Another definition is provided by Cameron (1963) who says, "Schizophrenic reactions are regressive attempts to escape tension and anxiety by abandoning realistic interpersonal object relations and constructing delusions and hallucinations" (p. 584).

At the present time, the symptom complex subsumed under the term schizophrenia is classified and categorized into a varying number of types, depending upon the classification system employed. There are four classical types which are identified as simple, hebephrenic, catatonic, and paranoid schizophrenia. Additional types are often used in psychiatric diagnoses, acute undifferentiated type and chronic undifferentiated type, which are convenient labels to apply in cases which are difficult to classify. Similarly, the schizo-affective type makes provision "for the inevitable compromise between schizophrenic and manic or depressive reactions actually encountered in practice" (Cameron, 1963, p. 585).

The Diagnostic and Statistical Manual of Mental Disorders, DSM-II, published by the American Psychiatric Association (1968) lists some eleven types of schizophrenia. Descriptions of these types quoted from the manual follow:

> 295 Schizophrenia
>
> This large category includes a group of disorders manifested by characteristic disturbances of thinking, mood and behavior. Disturbances in thinking are marked by alterations of concept formation which may lead to misinterpretation of reality and sometimes to delusions and hallucinations, which frequently appear psychologically self-protective. Corollary mood changes include ambivalent, constricted and inappropriate emotional responsiveness and loss of empathy with others. Behavior may be withdrawn, regressive and bizarre. The schizophrenias, in which the mental status is attributable primarily to a thought disorder, are to be distinguished from the Major affective illnesses (q.v.) which are dominated by a mood disorder. The Paranoid states (q.v.) are distinguished from schizophrenia by the narrowness of their distortions of reality and by the absence of other psychotic symptoms.
>
> 295.0 Schizophrenia, simple type
>
> This psychosis is characterized chiefly by a slow and insidious reduction of external attachments and interests and by apathy and indifference leading to impoverishment of interpersonal relations, mental deterioration, and adjustment on a lower level of functioning. In general, the condition is less dramatically psychotic than are the hebephrenic, catatonic, and paranoid types of schizophrenia. Also, it contrasts with schizoid personality, in which there is little or no progression of the disorder.
>
> 295.1 Schizophrenia, hebephrenic type
>
> This psychosis is characterized by disorganized thinking, shallow and inappropriate affect,

unpredictable giggling, silly and regressive behavior and mannerisms, and frequent hypochondriacal complaints. Delusions and hallucinations, if present, are transient and not well organized.

295.2 Schizophrenia, catatonic type
295.23 Schizophrenia, catatonic type, excited
295.24 Schizophrenia, catatonic type, withdrawn

It is frequently possible and useful to distinguish two subtypes of catatonic schizophrenia. One is marked by excessive and sometimes violent motor activity and excitement and the other by generalized inhibition manifested by stupor, mutism, negativism, or waxy flexibility. In time, some cases deteriorate to a vegetative state.

295.3 Schizophrenia, paranoid type

This type of schizophrenia is characterized primarily by the presence of persecutory or grandiose delusions, often associated with hallucinations. Excessive religiosity is sometimes seen. The patient's attitude is frequently hostile and aggressive, and his behavior tends to be consistent with his delusions. In general the disorder does not manifest the gross personality disorganization of the hebephrenic and catatonic types, perhaps because the patient uses the mechanism of projection, which ascribes to others characteristics he cannot accept in himself. Three subtypes of the disorder may sometimes be differentiated, depending on the predominant symptoms: hostile, grandiose, and hallucinatory.

295.4 Acute schizophrenic episode

This diagnosis does not apply to acute episodes of schizophrenic disorders described elsewhere. This condition is distinguished by the acute onset of schizophrenic symptoms, often associated with confusion, perplexity, ideas of reference, emotional turmoil, dreamlike dissociation, and excitement, depression, or fear. The acute onset distinguishes this condition from simple schizophrenia. In time these patients may take on the characteristics of catatonic, hebephrenic

or paranoid schizophrenia, in which case their diagnosis should be changed accordingly. In many cases the patient recovers within weeks, but sometimes his disorganization becomes progressive. More frequently remission is followed by recurrence. . . .

295.5 Schizophrenia, latent type

This category is for patients having clear symptoms of schizophrenia but no history of a psychotic schizophrenic episode. Disorders sometimes designated as incipient, pre-psychotic, pseudoneurotic, pseudopsychopathic, or borderline schizophrenia are categorized here. (This category includes some patients who were diagnosed in DSM-I under "Schizophrenic reaction, chronic undifferentiated type." Others formerly included in that DSM-I category are now classified under Schizophrenia, other (and unspecified) types (q.v.)

295.6 Schizophrenia, residual type

This category is for patients showing signs of schizophrenia but who, following a psychotic schizophrenic episode, are no longer psychotic.

295.7 Schizophrenia, schizo-affective type

This category is for patients showing a mixture of schizophrenic symptoms and pronounced elation or depression. Within this category it may be useful to distinguish excited from depressed types as follows:

295.73 Schizophrenia, schizo-affective type, excited
295.74 Schizophrenia, schizo-affective type, depressed

295.8 Schizophrenia, childhood type

This category is for cases in which schizophrenic symptoms appear before puberty. The condition may be manifested by autistic, atypical, and withdrawn behavior; failure to develop identity separate from the mother's; and general unevenness, gross

> immaturity and inadequacy in development. These developmental defects may result in mental retardation, which should also be diagnosed. (This category is for use in the United States and does not appear in ICD-8. It is equivalent to "Schizophrenic reaction, childhood type" in DSM-I.)
>
> 295.90 Schizophrenia, chronic undifferentiated type
>
> This category is for patients who show mixed schizophrenic symptoms and who present definite schizophrenic thought, affect and behavior not classifiable under the other types of schizophrenia. It is distinguished from Schizoid personality (q.v.). (This category is equivalent to "Schizophrenic reaction, chronic undifferentiated type" in DSM-I except that it does not include cases now diagnosed as Schizophrenia, latent type and Schizophrenia, other (and unspecified) types. (pp. 33-35)

Vetter states that schizophrenia, regardless of the age of the individual, "is used increasingly to refer to a group of disorders with some common factors and some wide behavioral differences rather than a well-defined and limited group of psychopathologies" (1968, p. 3).

In the opinion of Cameron (1963, p. 577), "Schizophrenic reactions are the most fascinating in all behavior pathology." He states that there is more interest in this subject on the part of clinicians and researchers today than ever before, and that "Schizophrenia is the subject of lively controversies from every angle."

Incidence and Prevalence

There is some question concerning the incidence and prevalence of schizophrenia. According to Redlich and Freedman (1966, p. 461) there are no reliable estimates of incidence of the disorder and they suggest that this is due to the fact that agreements on diagnosis are far from satisfactory. These authors, however, add that statistics of hospitalized schizophrenics indicate that there are more females than males admitted and that hospitalization periods are longer for females. Also, age of onset of adult schizophrenia has been reported in the range from as early as puberty to as late as 60 to 70 years of age; however, there appear to be more admissions for the first diagnosis of schizophrenia occurring in the young adult years. Age at onset is reported to occur later in females than in males.

Other incidence figures are reported by Kolb (1968, p. 359) who advises that calculations made from various epidemiological surveys indicate an incidence rate of 1 per cent for the population. This is supported by Arieti (1971) who states that the incidence of schizophrenia in the general population is usually given as 0.85 per cent. Kolb reports that 25 per cent of first admissions to public mental hospitals in this country are schizophrenic patients

and, further, that due to the chronic nature of the disorder, some 60 per cent of patients in state hospitals are schizophrenics.

The Symptomatology of Schizophrenia

Certainly, there is a noticeable difference between the behavior of the normal individual and the person who manifests symptoms of chronic schizophrenia. It is equally certain, though, that there often is no abrupt change from the 'preschizophrenic' phase, which may last from one to two years, to the manifest psychosis (Kolb, 1968, p. 363). Instead, certain subtle changes may have occurred which become manifest as vagueness of thought and blandness of affect. Increasing tension, confusion, distractibility, and inability to maintain a train of thought during conversations have been observed in early schizophrenia. Frequently, when talking to others, the schizophrenic will have breaks or long pauses in his speech which seem related to the introduction by others of abstract topics. In these instances, the schizophrenic may discontinue his verbalization, fail to respond in an appropriate manner to the ongoing conversation, and stare blankly at his surroundings. Kolb advises that, at such times, he may appear to have increased sensitivity to extraneous auditory and visual

stimului in his environment and that "his responses thereto intrude into these transactions, producing a degree of distractibility" (1968, p. 363). Later, the schizophrenic may describe these lapses in communication and attention as a 'temporary blackout,' a 'trance,' or a 'blank spell.'

The individual suffering from schizophrenia is described as having difficulty in maintaining perceptual constancy in terms of his own body and its parts and the outside world. This perceptual dysfunction causes him to sense changes in size and shape of his own body parts as well as those of other individuals or in inanimate objects. Impulsive rejection and mutilation of his body are often manifestations of the advanced schizophrenic.

Aloofness and withdrawal are common early symptoms of the disorder. The schizophrene appears to be preoccupied and is described as being 'far away'; it is observed that he fails to empathize with others and does not exhibit concern for the realities of life. His future plans are frequently vague and unrealistic. Often his ideas are not completely thought out, and fragments of ideas are connected in an illogical way to make up a new idea. "Concepts lose their completeness, and seem to dispense with one or more of their essential components; indeed, in many cases they are only represented by a few truncated notions" (Bleuler,

1950, p. 9). In this way, associational processes are dependent upon fragmented ideas and concepts resulting in bizarre associations which are erroneous and unpredictable. The schizophrenic individual frequently interrupts the process of thinking in the middle of a thought or in making the transition to a different idea; he may suddenly discontinue this conscious process completely. Rather than developing and continuing the thought, a completely new idea is introduced which cannot be related to the preceding train of thought by either the schizophrene or his listener.

In addition, other symptoms typically manifested by the majority of hospitalized schizophrenic patients include auditory and visual hallucinations, delusions, confusion, stupor, mania and melancholic affective fluctuations, and catatonic symptoms (Bleuler, 1950, p. 10). Vetter (1968) summarizes the typical characteristics of the disorder as follows:

1. Withdrawal from, and retraction of interest in, the environment.

2. Disturbances of thought expressed in blocking, symbolization, incoherence, perseveration, and condensation.

3. Increased daydreaming and autistic behavior in general.

4. Alteration of overt behavior with a tendency toward excess. This may be either in a

marked increase in motor activity, or a marked decrease in the direction of immobility. Motor behavior tends to be characterized by perseveration and stereotypy.

5. Distortion or inappropriateness of affect, especially in regard to the underlying thinking of the individual and the meaning of the situation. The divergence between feeling and thinking is perhaps the most general characteristic of schizophrenic behavior. (pp. 3-4)

Previous Studies of Communication Abilities in Schizophrenia

The speech and language of the schizophrenic patient have been subjected to many investigations which have attempted to establish formal characteristics of language and thought in schizophrenia (Vetter, 1968). Most of these studies have analyzed word count frequency, type/token and verb/adjective ratios, and theme and content.

From these studies has evolved a number of characteristics which are considered typical of the schizophrenic. Arieti (1955) suggests that these include (1) impaired symbolization and socialization (p. 297), and (2) "impairment, in various degrees, of the ability to abstract" (p. 315). Difficulties with symbols are manifested in schizophrenia by the frequent use of paleosymbols (private symbols understood only by the individual who produces them) instead of the social (or verbal or common or communicable) symbols

which make social integration possible. This is the process by which the schizoid desocializes himself; he is unable to use the common symbols of his society. "Although he may still use common symbols, many of which have undergone a paleologic or private distortion, he is predominantly living at the paleosymbolic level" (Arieti, 1955, p. 298). Further, the distorted symbols, in addition to verbal symbols, include gestures and motions. These nonverbal communication symbols when desocialized by the schizophrene become mannerisms, grimaces, and stereotyped movements which are unintelligible to the society. Arieti suggests, however, that the schizophrenic individual does not necessarily fail to comprehend the meanings of common symbols that society has attached to them. While this may be true in chronic schizophrenia of long duration, in most cases the individual understands the symbols, "but they are emotionally remote to him; they are like foreign bodies, and do not arouse in him the strong reactions that his own paleosymbols do" (Arieti, 1955, p. 298). Thus, the schizophrenic is desocialized because his symbolic world is not common to his society.

The more he becomes desocialized, the more difficult it is to understand his language which ultimately reaches a peak as the word salad of schizophrenia. Vetter (1968) describes word salad as consisting "of speech made out of

words that seem unrelated to one another, such as 'the house burnt the cow horrendously always'" (p. 10).

The schizophrenic's impaired ability for abstract thinking is demonstrated by the principle of Von Domarus (1944). Vetter (1968, p. 10) provides the following example. Suppose the following information is given to a schizophrenic: "Socrates is a man--all men are mortal--Socrates is mortal." The schizophrenic is likely to conclude: "Socrates is a man--I am a man--I am Socrates." Von Domarus postulates that the schizophrenic, because of his paralogical thinking and reasoning, accepts identity based upon identical predicates rather than upon the basis of identical subjects as is the case of logical thought of normal individuals.

Communication behavior in schizophrenia has been well described in the literature and at times there are analogies drawn between the language behavior of schizoids and aphasics. Critchley (1964) admonishes, however, that while there are often similarities in verbal and graphic productions of a schizophrenic patient and an aphasic, these similarities must not be overemphasized, "an analogy must remain an analogy and nothing more" (Critchley, 1970, p. 354).

The deficit in selective attention reported in schizophrenia has been investigated under experimental conditions. Chapman and McGhie (1962) found that the administration of a battery of tests which assessed the schizophrenic patient's ability to perceive and recall a series of nonmeaningful auditory and visual stimuli indicated that short-term memory in this population is particularly vulnerable to interference by irrelevant stimuli. The subject's task was to observe and report the relevant series of rapidly presented letters and digits, while ignoring the series of irrelevant information which was presented simultaneously. In some experimental conditions, the relevant and irrelevant information were both presented by the same sensory modality, while in others two sensory inputs were used. The results of this study indicate that the relative inability of the schizophrenic patient to screen out irrelevant extraneous information results in overloading of short-term memory.

Other studies suggest that impairment in speech perception demonstrated by schizophrenics may be related to their lack of memory facilitation due to contextual constraints. In order to understand the meaning of a sentence or passage, a listener must be able to retain in his short-term memory the key words at the beginning

of the utterance. Some of the subsequent words in the passage may be considered to be 'redundant' because they are decided by the words which precede them. Frequently, the meaning of a sentence or passage would remain intact without such 'redundant' words. The deficit in the selective and inhibitory functions of attention manifested in schizophrenia has given rise to the suggestion by Lawson, McGhie, and Chapman (1964) that "the schizophrenic patient is less able to carry out the normally automatic process of partially screening out the redundant words which occur in most verbal communications" (p. 379). They suggest that if the schizophrenic's short-term memory is vulnerable to interference and distraction, the redundant words of which a normal listener is hardly aware, may cause great distraction to the schizophrenic patient and interfere with his perception of a spoken passage. Varying degrees of contextual constraint have been used to investigate this hypothesis. A study by Lawson et al. (1964) has indicated that schizophrenics have no more difficulty than normals in learning material with little constraint such as random word-strings, while material having the greatest contextual constraint, organized passages of grammatical English, produced significantly poorer performance than normal subjects. These authors conclude that their findings indicate that the

schizophrenic's difficulty appears to be related to an inability to perceive a series of words as an organized pattern and that "the schizophrenic group were comparatively unable to utilize the increasing degrees of contextual organization to improve their performance" (Lawson et al., 1964, p. 380). The findings of a more recent study by Truscott (1970) show that the performance of schizophrenics on recall tasks was poorer than normals under all conditions of varying contextual constraint. Her data suggest that the semantic relationships among the contextual elements may affect schizophrenic performance. She concludes that "Without adequate facilitation from the semantic component, language for the schizophrenic becomes an inadequate instrument of communication" (Truscott, 1970, p. 193).

Another explanation that has been suggested by McGhie, Chapman, and Lawson (1964) is:

> . . . schizophrenic deficiency in speech perception could be viewed as a relative inability to utilize the transition probabilities between words occurring in normal discourse, so that what to others would be an organized pattern of words, appeared to the schizophrenic to be a disorganized series of isolated word units. (p. 421)

Differential Diagnosis of Schizophrenia

During recent years, there has been considerable interest directed toward the problem of differentiation of schizophrenic patients and individuals with organic brain damage. Most of the previous research, however, has been concerned with psychological tests which are not normally considered to be part of the speech pathologist's armamentarium.

Watson (1971) reports that most ability-oriented brain-damage tests are not useful in distinguishing between the two groups. He suggests that "the motivational deficits of schizophrenics, when coupled with the partial recovery common in organics, result in quantitatively similar productions on most ability-oriented tests" (Watson, 1971, p. 121). Included in the instruments which have been studied relative to their diagnostic value, but which have failed to be useful, are the Bender-Gestalt (Watson, 1968), Memory-for-Designs (Ascough, Smith, Strouf, and Cohn, 1971), several Draw-A-Person indices (Watson, Felling, and MacEachern, 1967), and Wechsler measures (Watson, 1965). That many psychometric instruments have not been successful in attempting to differentiate organic brain damage from schizophrenia is supported by Spreen and Benton (1965) who reviewed 21 studies which appeared in recent psychological

literature. De Wolfe (1971) suggests that making this type of differentiation is difficult because most tests base their results and findings on overall performance in terms of intellectual functioning which typically is reduced both in brain-damaged subjects and in schizophrenic patients. De Wolfe, rather than looking at overall performance, examined patterns resulting from performance on the subtests of the Wechsler Adult Intelligence Scale (WAIS). He found that he could distinguish between patients with diffuse brain damage and patients diagnosed as chronic schizophrenics on the basis of their relative WAIS subtest results.

That personality test measures may be better instruments in the differentiation of schizophrenics and subjects with brain damage is postulated by Watson (1971) who developed three Minnesota Multiphasic Personality Inventory (MMPI) scales which were administered to 65 male schizophrenics and to 61 male patients with organic brain damage, all under 60 years of age. Watson reports encouraging results and states that the MMPI scales appear to be useful differentiators of males with organic brain damage and males who have been diagnosed as schizophrenic. He cautions against the use of these scales as general indicators of brain damage or schizophrenia, however, and

suggests that they be used with patients whose diagnosis has been established. Watson concludes that the MMPI scales be used with patients who demonstrate poor performance on ability-oriented organicity tests to differentiate organic deficits from functional deficits.

Purpose of the Study

The purpose of this study was to attempt to differentiate the pattern of language performance of schizophrenics (experimental group) from that of aphasics (control group). In addition, the investigator sought to answer certain relevant questions. Are there significant differences between PICA overall means between the schizophrenic group and the brain-injured group? Are there significant differences in the relationships between the PICA modality means of the experimental group and the control group? Are there significant differences in the hierarchy of PICA subtests between the two groups?

CHAPTER II

MATERIALS AND PROCEDURES

Selection of Subjects

Experimental Group

Twenty-three adult subjects who were medically diagnosed as schizophrenic and who were undergoing treatment for the disorder in the Psychiatric Service were selected. No limitations were placed in terms of sex of subject, or type of schizophrenia. Subjects between the ages of 18 and 60 years were acceptable for inclusion in the sample. The medical history in each of the subject's hospital treatment chart was screened and no subject with a confirmed diagnosis of organic brain damage, such as cerebral vascular accident or epilepsy, was included. All subjects, on the basis of recent examination, were reported to be within normal limits neurologically.

Subjects were selected from patients who were referred by staff psychiatrists for evaluation of speech and language skills while they were at the Veterans Administration Hospital, Gainesville, Florida. All

subjects were native speakers of the English language and all had auditory sensitivity described as being within normal limits. Subjects with visual acuity impairment were acceptable provided corrective lens were worn during testing precedures administered during this study. Table 1 contains the descriptive data for the experimental group.

Control Group

The control group used in this study was comprised of the 150 brain-injured subjects studied by Porch (1967) in the development and standardization of the Porch Index of Communicative Ability. The original data containing each individual patient's mean performance score on the 18 subtests of the PICA and the overall and modality means were made available by B. E. Porch. There were 86 males and 64 females. The age of the group was in the range from 18 to 90 years; the mean age was 60.5 with a standard deviation of 15. Educational level of the group was in the range from 0 to 16 years; the mean was 8.22 with a standard deviation of 4.19.

Clinical Tests and Procedures

Two tests were used in this study: a quantified measure of speech and language abilities, and a measure of auditory processing function.

TABLE 1. EXPERIMENTAL GROUP SUBJECT DESCRIPTIVE DATA

Subject	Type of Schizophrenia[1]	Age	Sex	Years of Formal Education	Duration of Disorder (YPO)[2]
1	PC	46	M	10	3
2	PC	42	M	10	4
3	SAC	50	F	14	30
4	PA	24	M	14	1
5	PC	22	M	13	1
6	CU	43	M	12	19
7	PC	31	M	12	8
8	CU	25	M	12	2
9	PC	54	F	10	26
10	PC	29	M	12	9
11	PC	40	M	8	19
12	PC	40	F	16	10
13	PC	26	M	13	3
14	PC	51	M	9	4
15	SAC	22	M	12	4
16	HA	19	M	9	1
17	SC	38	M	12	4
18	PC	29	M	13	2
19	PA	23	M	12	1
20	CU	24	M	12	5
21	SA	24	M	13	1
22	CU	26	M	12	6
23	PC	33	M	12	4
Range		19-54		8-16	1-30
Mean		33.09		11.82	7.26
S.D.		10.44		1.79	8.08

[1]Type of Schizophrenia:
CU = Chronic Undifferentiated type
PA = Paranoid type, acute
SA = Simple type, acute
SAC = Schizo-affective type, chronic
HA = Hebephrenic type, acute
PC = Paranoid type, chronic
SC = Simple type, chronic

[2]YPO is the duration of disorder in years since subject was first diagnosed as schizophrenic to date of testing.

Speech and Language Abilities

The Porch Index of Communicative Ability (PICA) (Porch, 1967; 1971) was administered to measure selected language performance. The PICA is a standardized test, comprised of 18 subtests, which assesses verbal, gestural, and graphic communicative responses. Each subtest involves 10 common objects which are placed in a prescribed arrangement before the subject, as shown in Appendix A (Porch, 1967; 1971, p. 4). Each subtest includes 10 tasks using these objects, which, according to Porch (1967)

> . . . were selected according to the following criteria: (1) common to the experience of adults of both sexes, (2) capable of being demonstrated gesturally, (3) approximately equal in difficulty across all tests. The objects used in the present test are listed here in standard order, i.e., the order in which they are presented to the patient:
>
> 1. Toothbrush
> 2. Cigarette
> 3. Pen
> 4. Knife
> 5. Fork
> 6. Quarter
> 7. Pencil
> 8. Matches
> 9. Key
> 10. Comb
>
> (p. 18)

The subject "is required to listen, speak, read, write, feel, and gesture at different levels of complexity" (Porch, 1971, p. 785) which permits assessment of both auditory and visual receptive modalities in addition to measurement of performance in terms of the three expressive modalities. Each of the 180 responses yielded by the PICA test battery

was scored on a multidimensional scale as shown in Appendix A (Porch, 1967; 1971, p. 12). Administration of the PICA battery to all subjects involved in this study was conducted under standard test conditions as described in Volume I of the PICA manual (Porch, 1967); a brief resume of the test conditions follows:

Standard test conditions.--Each testing session was conducted in a quiet room which was routinely used for diagnostic evaluations and therapy sessions by clinical speech pathologists. The test objects were arranged on a green desk blotter (size 24" x 19") which was placed on a table. The subject was seated at the table so that the test objects were directly in front of him; the examiner was seated on the right hand side of the patient in a position which afforded him an unobstructed view of the test objects and the subject's manipulation of them.

Testing procedure.--At the beginning of the testing session, the patient was requested to be seated at the table in a position so that he could see and reach the test objects. A brief interview was conducted during which it was determined if the subject used eyeglasses, a hearing aid, dentures, or other prosthetic communication devices, as the examiner solicited any pertinent data that were missing from the subject's case history which had been

obtained previously from the individual's medical chart. Immediately prior to administering the first of the 18 PICA subtests, the examiner gave the following pretest instructions (Porch, 1967):

> Can you see all of these objects on the table? (gesture) I'm going to ask you to do some things with them. Some of the things I ask you to do will be hard to do and some will be easy, but I want you to do everything as completely and as well as you can. . . . Are you ready? (p. 19)

During the administration of each subtest, when the subject failed to respond to a test item within 30 seconds of presentation of the stimulus, or when the response indicated that the subject misinterpreted the instructions, a repetition of the applicable instructions was given. This was referred to as a repeat and was specified in the Test Format booklet. Should a response not be elicited or, if the subject requested further clarification, the cue was presented as specified in the Test Format booklet. In order to insure uniform testing procedures, no additional information was given to the subject by the examiner other than the standardized repeat and/or cue.

Test scoring.--Each of the 180 responses yielded by the PICA battery was scored according to the multidimensional scoring system and entered on the single score sheet shown in Appendix A (Porch, 1967; 1971, p. 21).

Following completion of the entire test battery, the 180 item scores were converted to a mean for each of the 18 subtests, an overall mean, and a mean for each of the three response modalities.

Audio recording.--The testing room was equipped with an overhead omnidirectional microphone which was suspended over the table at which the subject and examiner were seated. The microphone was connected to an audio tape-recorder (Wollensak Model 9522) located in an adjacent room. An audio recording was made of the complete testing session so that the subject's verbal responses and repeats and cues given by the examiner could be confirmed when necessary to resolve questions relative to test item scoring.

Auditory Processing Function

The modified 40-item Token Test (LaPointe, Andersen, Cutler, Horsfall, McCall, and Ready, 1971) was administered to assess auditory processing in each subject. This modified version of the Token Test was standardized from data collected during a recent study which sampled 60 nonbrain-damaged adult subjects who were hospitalized as patients in a Veterans Administration hospital. The Token Test, originally developed and introduced by De Renzi and Vignolo (1962) is comprised of 62 test items. The modified version

is reduced to 40 test items which are presented in four test parts of five items each and a fifth test part of 20 items.

The Token Test has been the subject of a number of research studies which support its use as a valid tool to detect impairment in auditory processing which is not obvious during routine clinical evaluations (De Renzi and Vignolo, 1962; Boller and Vignolo, 1966). "The verbal commands of the test vary in linguistic complexity, but remain relatively free of the cues inherent in the redundancy of language, such as clues coming from the situation, clues given by the nature of objects, and clues given by verbal content" (LaPointe et al., 1971, pp. 1-2).

The test materials are comprised of tokens in two shapes (circles and rectangles), two sizes (large and small), and five colors (blue, green, red, white, and yellow), and are arranged in rows. The five test parts are presented in a ranked order of increasing difficulty.

Administration of the modified 40-item Token Test was accomplished in accordance with the standardized procedures as follows:

Standard test conditions.--The test was conducted in a quiet room with the subject and examiner seated at a table as described in procedures for PICA testing. The tokens

were placed on the table in front of the subject in different configurations for each of the five test parts as prescribed on the test form. The test form is shown in Appendix B.

Testing procedure.--The test has five parts which are ordered according to degrees of increasing difficulty. In the first four parts, each command includes a verb and object while the fifth part is the most difficult and uses more complex linguistic structures, as shown in the test format (Appendix B). For example, in Part I, in which only the five large rectangles and five large circles were used, the examiner gave the instruction according to color and shape, such as "Touch the red circle." In Part II, in which all 20 of the tokens were used, a third dimension of size was added so that three specific words were necessary to correctly identify a token, such as "Touch the small blue circle." In Part III, only the 10 large tokens were displayed, but the instruction included two items, such as "Touch the red circle and the green rectangle." All tokens were employed in Part IV, as were the three dimensions of color, shape, and size, so that a command such as "Touch the small yellow circle and the large green rectangle" was given. Although only the 10 large tokens were used in Part V, the commands were more complex because of increased

linguistic difficulty. The instructions given in most of the commands "contain a new grammatical element; a preposition, a conjunction, or an adverb. These additions give the command much greater linguistic subtlety and radically change the meaning of the action" (LaPointe et al., 1971, p. 3). The Token Test responses were scored on a pass-fail basis on the first trial; no item was repeated.

Test-Retest Criteria

Upon successful completion of the initial testing session, each subject was scheduled for a retest session for both the PICA battery and the Token Test. Retesting was conducted no earlier than one week and no later than two weeks after the initial test session.

Test Administration

Prior to scheduling subjects for testing, the investigator interviewed each referred patient on the ward and explained to the individual that he was to be scheduled by his physician for 'a speech and language evaluation' in the Speech Pathology Clinic. The examiner also informed the subject that "we will ask you to do some things with some common everyday objects; we will ask you to talk about, demonstrate, and write about them." Each subject was given an appointment time to report to the testing location, a

room usually used for diagnostic evaluations and therapy sessions by speech pathologists. One subject, who refused to leave the security of the familiar surroundings of the psychiatric ward, was tested in a private consultation room on the ward. This room approximated the testing environment of the Speech Pathology Clinic facilities in terms of size and decor. Subjects were presented for testing either under escort of an attendent or unescorted, in accordance with the individual subject's ward privileges. All subjects were ambulatory and without restraints. Test sessions ranged from 24 minutes to 83 minutes to complete one administration of all experimental tests.

Of the 25 patients referred as subjects for this study, 23 subjects completed all phases satisfactorily. Two patients were excluded from the study because they were unable to complete all phases. One subject was discharged from hospitalization after completing all phases of the initial test administration but before the scheduled date for retesting. The second subject was unable to tolerate the test procedures and testing environment and was excused from participation in the study.

Test order was the same for all subjects for both the initial and retest administration. The following order of test presentation was used:

1. Porch Index of Communicative Ability (PICA)

2. Modified 40-item Token Test

Instructions for the tests were the same for all subjects. During the administration of all phases of the test procedures, the responses of each subject were recorded on the appropriate PICA or Token Test score sheet.

CHAPTER III

RESULTS

Behavioral Measures

The PICA battery of 18 subtests was administered to each of the 23 subjects in the experimental group during the testing session without interruption or deviation from the standard test conditions or testing procedures.

Responses of each subject on the battery were scored according to the PICA multidimensional scoring system (Appendix A). Numerical values assigned to the 180 responses were reduced to a mean score for each of the 18 subtests (I-XII and A-F), an overall mean (AO), and individual means for the gestural (G), verbal (V), and graphic (GR) response modalities. The time required to administer the PICA battery to each subject was recorded. Control group data included the 18 PICA subtest means and OA, G, V, and GR means. The PICA battery time was not available for individual subjects; however, the group mean was 60.75 minutes.

A comparison of general performances of the experimental group and the control group in terms of mean response level for each subtest is made in Figure 1 and Table 2. The performances of each group on each subtest, arranged according to response modalities, are shown in Figure 2 and Table 3. The mean response of each group on each subtest is ranked, according to degree of difficulty, and compared in Figure 3 and Table 4. The most difficult subtest, Test A, is designated '1'; while the least difficult subtest, Test XI, is designated '18'. Table 4 shows that subtests A, C, and XI, which were the most difficult, the third most difficult, and the easiest subtests for both groups, respectively, did not change in rank order hierarchy. All other PICA subtests were re-ordered in this hierarchy for the schizophrenic group.

The general performance of the schizophrenics was higher than that of the brain-injured subjects on all PICA subtests. There was some evidence to support previous reports that PICA subtests that are among the 'less difficult' for the brain-injured are among the 'more difficult' for schizophrenics (Porch, 1967; Fust, 1972). When the relationships among subtests are examined for both groups, a clear departure is seen in the hierarchy of difficulty for the schizophrenic group. This re-ordering of subtest

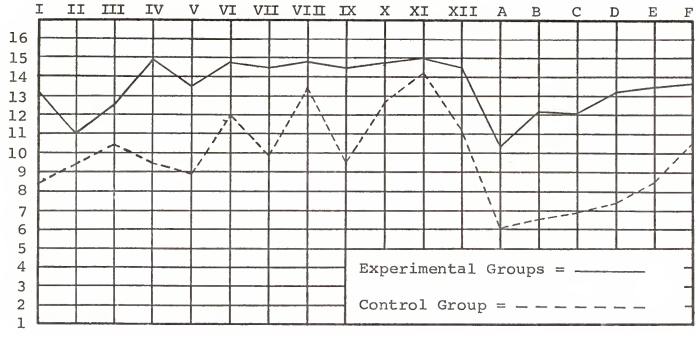


FIGURE 1. GRAPHIC COMPARISON OF PERFORMANCE MEANS OF EXPERIMENTAL AND CONTROL GROUPS

TABLE 2. COMPARISON OF PERFORMANCE MEANS OF EXPERIMENTAL AND CONTROL GROUPS

Group	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Experimental	13.19	11.00	12.50	14.87	13.60	14.81	14.61	14.79	14.48	14.79	14.99	14.55
Control	8.40	9.37	10.36	9.45	8.87	12.00	9.94	13.44	9.48	12.67	14.22	11.17

Group	A	B	C	D	E	F
Experimental	10.28	12.13	12.02	13.13	13.47	13.69
Control	6.01	6.62	6.94	7.39	8.56	10.49

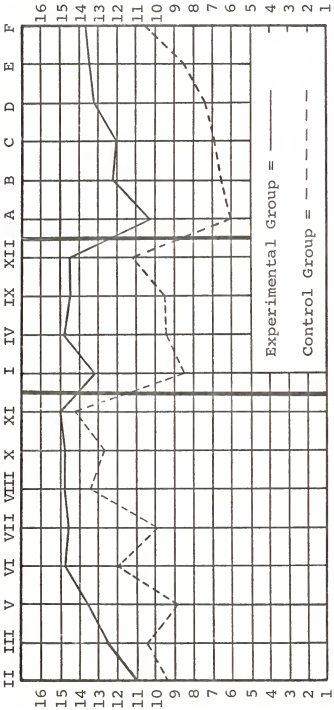


FIGURE 2. MODALITY RESPONSE SUMMARIES FOR EXPERIMENTAL AND CONTROL GROUPS

TABLE 3. COMPARISON OF PERFORMANCE MEANS BY MODALITIES OF EXPERIMENTAL AND CONTROL GROUPS

Group	Gestural								Verbal			
	II	III	V	VI	VII	VIII	X	XI	I	IV	IX	XII
Experimental	11.00	12.50	13.60	14.81	14.61	14.79	14.78	14.99	13.19	14.87	14.48	14.55
Control	9.37	10.36	8.87	12.00	9.94	13.44	12.67	14.22	8.40	9.37	9.48	11.17

Group	Graphic						Means			
	A	B	C	D	E	F	OA	G	V	GR
Experimental	10.28	12.13	12.02	13.13	13.47	13.69	13.49	13.89	14.27	12.45
Control	6.01	6.62	6.94	7.39	8.56	10.49	9.75	11.36	9.62	7.67

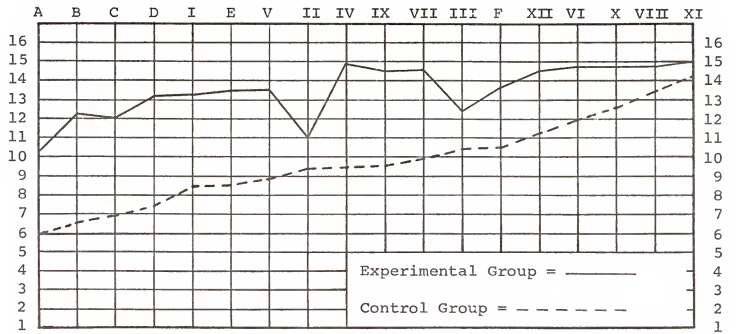


FIGURE 3. RANKED RESPONSE SUMMARIES FOR EXPERIMENTAL AND CONTROL GROUPS

TABLE 4. COMPARISON OF DEGREE OF DIFFICULTY OF PICA SUBTESTS BETWEEN SCHIZOPHRENIC AND APHASIC GROUPS

Group	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A	B	C	D	E	F
Experimental	7	2	5	17	9	16	13	15	11	14	18	12	1	4	3	6	8	10
Control	5	8	12	9	7	15	11	17	10	16	18	14	1	2	3	4	6	13

difficulty for the experimental group is shown in Table 4.

Table 3 reveals an interesting trend, however. There was a reversal of the relationships of means for gestural (G) and verbal (V) modalities between the experimental group and the control group. This indicates that schizophrenics experienced less difficulty with verbal response tasks than with gestural tasks which is a reversal of performance when compared with the brain-damaged group. Aphasic subjects perform better on gestural response tasks than on verbal response tasks (Porch, 1967). Both groups experienced the greatest difficulty with graphic response tests. In order to determine whether or not there was a significant difference between the G and V means in terms of the reversal between groups, a t test was computed. The difference between the G mean and the V mean between the two groups was significant (t value = 3.46, df = 171, $p \leq .001$); however, the significant difference was actually due only to the aphasic group means. In the aphasic group, the difference between G and V means was highly significant (t value = 7.77). In the schizophrenic group, the difference between G and V means was not significant (t value = .67); the means were so close as to be considered equal.

Subtest, overall, and modality means and standard deviations were computed for both groups and are presented in Table 5. These data, derived from the initial administration of the PICA battery to the experimental group and control group data, were tested for significant differences between the means for each group. A series of t tests were computed. For the specified degrees of freedom (df = 171), a t value of 2.61 was significant at the .01 level of confidence. All PICA means were found to have significant differences at the .01 level, except for Test VIII and Test XI (Table 5). Test B was the variable which had the greatest significant difference between means for the experimental and control groups.

Pearson product-moment correlation coefficients (r) were computed to explore the relationships among the 28 variables in the experimental group (Table 6).

When OA means were compared with the three modality means and the Token Test score (TTS), they were found to be highly correlated in a positive direction at the .01 level of confidence (Table 7).

TABLE 5. COMPARISON OF PICA PERFORMANCE BETWEEN EXPERIMENTAL AND CONTROL GROUPS

Variable	Experimental Group Mean	S.D.	Control Group Mean	S.D.	Mean Differences	t Value
I	13.19	1.75	8.40	4.00	4.79	5.65**
II	11.00	1.39	9.37	2.68	1.63	2.84**
III	12.50	1.16	10.36	2.91	2.14	3.47**
IV	14.87	0.27	9.45	4.52	5.42	5.73**
V	13.60	0.84	8.87	3.69	4.73	6.10**
VI	14.81	0.28	12.00	3.33	2.81	4.04**
VII	14.61	0.67	9.94	3.67	4.67	6.08**
VIII	14.79	0.78	13.44	2.86	1.35	2.25
IX	14.48	0.52	9.48	4.44	5.00	5.38**
X	14.78	0.31	12.67	2.98	2.11	3.38**
XI	14.99	0.04	14.22	1.94	0.77	1.92
XII	14.55	1.15	11.17	4.45	3.38	3.61**
A	10.28	2.32	6.01	2.54	4.27	7.59**
B	12.13	2.35	6.62	3.07	5.51	8.22**
C	12.02	2.64	6.94	3.19	5.08	7.26**
D	13.13	2.07	7.39	3.45	5.74	7.76**
E	13.47	2.14	8.56	3.63	4.91	6.31**
F	13.69	1.44	10.49	3.14	3.20	4.80**
OA	13.49	0.91	9.75	2.70	3.74	6.58**
G	13.89	0.44	11.36	2.55	2.53	7.20**

TABLE 5 (CONTINUED)

Variable	Experimental Group Mean	S.D.	Control Group Mean	S.D.	Differences	t Value
V	14.27	0.72	9.62	4.15	4.65	5.34**
GR	12.45	1.94	7.67	2.87	4.78	7.71**

**Significant at .01 level of confidence

TABLE 6. CORRELATIONS AMONG 28 VARIABLES OF EXPERIMENTAL GROUP

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A	B	C	D	E	F	GA	G	V	GR	Aue	Educ	YPO	TTS	PICA	TTT
I	---	.37	.34	.15	.40	-.27	.41	.34	.25	.45*	.50*	.59**	.16	.09	.14	.29	.38	.30	.45*	.53**	.90**	.24	.15	-.22	-.10	.59**	-.17	-.49*
II		---	.77**	-.15	.31	.13	.58**	-.12	.29	.55**	.46*	.39	.45*	.54**	.46*	.58**	.55**	.68**	.69**	.87**	.41*	.58**	-.25	.11	-.43*	.50*	-.38	-.45*
III			---	-.32	.28	.04	.58**	-.15	.06	.25	.39	.33	.32	.43*	.36	.48*	.55**	.48*	.58**	.81**	.32	.49*	-.58**	.05	-.65**	.49*	-.66**	-.55**
IV				---	.43*	.07	.05	.24	.30	.27	.11	.17	.12	.02	.00	.07	.08	.03	.10	.03	.11	.06	.27	.26	.09	.14	.34	.05
V					---	-.05	.51*	-.10	.29	.35	.34	.28	.14	.14	.06	.27	.36	.36	.37	.57**	.44*	.23	-.18	.12	-.26	.44*	-.38	-.46*
VI						---	.12	.04	.16	.14	.01	-.06	.36	.53**	.56**	.46*	.08	.04	.30	.17	-.15	.40	-.33	.52**	.17	.06	.14	.00
VII							---	.03	.36	.66**	.74**	.70**	.52*	.71**	.66**	.64**	.82**	.72**	.82**	.81**	.59**	.76**	-.36	.23	-.34	.84**	-.61**	-.78**
VIII								---	.36	.18	.13	.42*	.28	.18	.12	.06	.12	.07	.22	.13	.46*	.16	.15	-.01	.01	.37	.06	-.29
IX									---	.67**	.30	.41	.30	.30	.24	.41	.23	.34	.42	.42	.52*	.33	-.01	.05	-.04	.57**	-.09	-.51*
X										---	.71**	.71**	.52*	.55**	.54**	.67**	.60**	.69**	.73**	.64**	.70**	.65**	.08	.05	-.10	.79**	-.07	-.59**
XI											---	.88**	.56**	.62**	.62**	.67**	.80**	.76**	.81**	.63**	.72**	.74**	-.19	-.02	-.29	.82**	-.21	-.52**
XII												---	.62**	.62**	.59**	.64**	.81**	.73**	.81**	.62**	.84**	.73**	-.17	-.10	-.34	.88**	-.19	-.62**
A													---	.82**	.79**	.80**	.62**	.68**	.83**	.56**	.41	.68**	-.27	.16	-.35	.56**	-.24	-.49*
B														---	.93**	.80**	.79**	.77**	.89**	.66**	.35	.96**	-.44**	.36	-.28	.64**	-.25	-.48*
C															---	.82**	.73**	.66**	.86**	.57**	.36	.94**	-.38	.34	-.17	.59**	-.16	-.38
D																---	.64**	.74**	.80**	.69**	.51*	.89**	-.30	.22	-.21	.66**	-.18	-.46*
E																	---	.78**	.87**	.73**	.60**	.84**	-.47*	.24	-.57**	.83**	-.41*	-.61**
F																		---	.86**	.73**	.54**	.84**	-.18	.04	-.11	.70**	-.25	-.62*
GA																			---	.85**	.68**	.96**	-.36	.21	-.40	.84**	-.36	-.65**
G																				---	.64**	.72**	-.39	.17	-.50*	.76**	-.56**	-.73**
V																					---	.50**	.04	-.14	-.19	.83**	-.16	-.63**
GR																						---	-.40	.27	-.36	.73**	-.29	-.53**
Aue																							---	.26	.68**	-.24	.50*	.35
Educ																								---	-.06	.10	-.09	.02
YPO																									---	-.37	.61**	.51*
TTS																										---	-.44*	-.83**
PICA																											---	.73**
TTT																												---

*Significant at the .05 level (r.05 = ± .41)
**Significant at the .01 level (r.01 = ± .53)
[1] YPO is the duration of disorder in years
[2] TTS is Token Test Score
[3] PICA is PICA battery administration time in minutes
[4] TTT is Token Test administration time in seconds

TABLE 7. CORRELATIONS BETWEEN OA AND G, V, AND GR MEANS AND TTS

Variable	G	V	GR	TTS
OA	.853**	.681**	.965**	.843**

**Significant at the .01 level of confidence ($r.01 = \pm .53$)

A comparison of OA and age, educational level, and duration of disorder (YPO) revealed that these variables are not correlated (Table 8).

TABLE 8. CORRELATIONS BETWEEN OA AND AGE, EDUCATIONAL LEVEL AND YPO

Variable	Age	Educational Level	YPO
OA	-.363	.206	-.399

Data not significant at .05 level of confidence

When G means were compared with V, GR, age, educational level, and YPO, high positive correlations were found between V and GR, while G and YPO were correlated in a negative direction. G was not correlated with age or with educational level (Table 9).

TABLE 9. CORRELATIONS BETWEEN G AND V, GR, AGE, EDUCATIONAL LEVEL, AND YPO

Variable	V	GR	Age	Educational Level	YPO
G	.645**	.725**	-.390	.173	-.504*

*Significant at .05 level of confidence ($r.05 = \pm .41$)
**Significant at .01 level of confidence ($r.01 = \pm .53$)

V and GR were shown to be significantly correlated in a positive direction; however, V is not correlated with age, educational level, or YPO (Table 10).

TABLE 10. CORRELATIONS BETWEEN V AND GR, AGE, EDUCATIONAL LEVEL, AND YPO

Variable	GR	Age	Educational Level	YPO
V	.503*	.045	-.138	-.194

*Significant at the .05 level of confidence ($r.05 = \pm .41$)

No significant correlations were found between GR and the three variables, age, educational level, and YPO (Table 11).

TABLE 11. CORRELATIONS BETWEEN GR AND AGE, EDUCATIONAL LEVEL, AND YPO

Variable	Age	Educational Level	YPO
GR	-.400	.272	-.355

Data not significant at .05 level of confidence

When Token Test (TTS) means were compared with the PICA Tests VI and X, there was a high correlation in a positive direction between TTS and X but no correlation between TTS and VI. This finding indicated that the Token Test (TTS), the measure of auditory processing function, had a significant interrelationship with only one of the two PICA subtests which assess auditory input, when administered to schizophrenics. Porch (1967) found that Tests VI and X were correlated (.88) for his sample of 150 brain-injured subjects.

The TTS means were found to be highly correlated in a positive direction with PICA OA, G, V, and GR means (Table 12).

TABLE 12. CORRELATIONS BETWEEN TTS AND OA, G, V, AND GR

Variable	OA	G	V	GR
TTS	.843**	.784**	.825**	.731**

**Significant at the .01 level of confidence ($r.01 = \pm .53$)

A high positive correlation (.92) was reported in brain-injured subjects between Tests II and III which involve demonstrating the function of the test objects (Porch, 1967). This relationship was found to be true for schizophrenics; a correlation of .769 was significant at the .01 level. Other subtests which involve similar skills, such as Tests V and VII which are visual linguistic tasks and assess reading, were found to be correlated in the experimental group, as they are in the control group.

The finding reported by Porch (1967) that all PICA subtests were positively correlated when administered to the brain-injured group was not true for the experimental group, as shown in Table 6.

Test-Retest Data

Pearson product-moment coefficients of correlation (r) were computed to show the relationships between the means

of the initial test and the retest. The data, shown in Table 13, reveal that there was a high positive correlation between the two test administrations for 23 of the 25 variables. The exceptions were the means for PICA Tests VI and VIII. There was a high positive correlation between test-retest overall means (.90). Porch (1967) reported similar findings on test-retest overall performance (.98) for his sample of 40 brain-injured subjects who were retested within two weeks of the initial test.

Discriminant Analysis

The data for both the experimental group and the control group were programmed to determine which variable was the most powerful discriminator between the two groups. The method used was a 2-step discriminant analysis. PICA Test B (F value = 67.61; df = 1 and 171) was shown to be the variable which differentiated best between the groups at the first step of the analysis. In the second step, Test B was removed as a variable. Subsequently, PICA Test II (F value = 5.83; df = 1 and 170) became the variable which when added to Test B improved differentiation between the two groups.

TABLE 13. CORRELATION BETWEEN TEST-RETEST ON EACH OF 25 VARIABLES IN SCHIZOPHRENIC SUBJECTS

Variable	Test Mean	S.D.	Retest Mean	S.D.	Correlation Coefficients (r)
I	13.19	1.71	13.59	1.46	.57**
II	11.00	1.36	11.28	1.48	.67**
III	12.50	1.13	12.30	1.30	.51*
IV	14.87	0.26	14.57	0.91	.56**
V	13.60	0.82	14.01	0.66	.50*
VI	14.81	0.27	14.77	0.34	.09
VII	14.61	0.65	14.40	1.10	.84**
VIII	14.79	0.76	14.85	0.38	.04
IX	14.48	0.51	14.56	0.58	.50*
X	14.78	0.31	14.76	0.54	.87**
XI	14.99	0.04	14.95	0.19	.94**
XII	14.55	1.12	14.86	0.32	.94**
A	10.28	2.27	10.67	2.32	.73**
B	12.13	2.29	12.35	2.38	.78**
C	12.02	2.58	12.63	1.77	.71**
D	13.13	2.02	13.42	2.15	.81**
E	13.47	2.09	13.43	2.02	.65**
F	13.69	1.41	13.89	1.11	.80**
OA	13.49	0.89	13.63	0.88	.90**
G	13.89	0.43	13.91	0.56	.84**

TABLE 13 (CONTINUED)

Variable	Test Mean	Test S.D.	Retest Mean	Retest S.D.	Correlation Coefficients (r)
V	14.27	0.71	14.40	0.69	.87**
GR	12.45	1.90	12.73	1.72	.82**
TTS	34.17	6.20	34.57	5.25	.94**
PICA(min.)	31.43	10.94	30.09	13.01	.84**
TTT(sec.)	323.26	91.58	298.30	76.33	.86**

*Significant at the .05 level of confidence ($r.05 \geq \pm .41$)
**Significant at the .01 level of confidence ($r.01 \geq \pm .53$)

CHAPTER IV

CONCLUSIONS AND SUMMARY

Discussion of Findings

The purpose of the present research was to collect data on selected language performance of schizophrenics and attempt to differentiate the pattern of language performance of this group from that of brain-injured subjects.

The differentiation in language performance in this sample of schizophrenic subjects and the sample of brain-injured subjects is not distinctive and clear. It is suggested that this lack of distinctive differentiation between the two groups may be related to the heterogeneous nature of the sample of brain-injured subjects. This group of 150 subjects, which represented "varying degrees of communicative involvement" (Porch, 1967, p. 20), produced a wide range of response scores on the PICA battery. The mean response levels of some of the brain-injured subjects with mild impairment were similar to the mean response levels of the schizophrenic group, making a distinct

differentiation difficult. There were, however, a number of significant differences between the two groups that were found.

As indicated in Table 4, there was a marked re-ordering of hierarchy according to degree of difficulty of PICA subtests for the schizophrenic group. The magnitude of shift in the rank order was most evident for Tests II, III, and IV. Test II which was number 8 in order of difficulty for brain-injured subjects was number 2 in difficulty for schizophrenics. Similarly, another gestural response measure, Test III moved from twelfth to fifth position. The opposite was the case for verbal subtest, Test IV, which was number 9 in degree of difficulty for the brain-injured group and number 17 for schizophrenics. Smaller shifts in position between the two groups were found for the other PICA subtests.

The re-ordering of subtest hierarchy in terms of degree of difficulty for the schizophrenic group, particularly the shift of Tests II and III along the continuum from most difficult to least difficult, underscores a second significant finding which concerns the reversal of mean levels of response between the two groups for the gestural and verbal modalities. As Table 3 indicates, in the experimental group the mean level of response in the

gestural (G) modality was lower than that in the verbal (V) modality. In the control group the mean response level in the gestural modality was a higher value than in the verbal modality. It is suggested that since there is a significant difference, in terms of this reversal, between the modality means of the two groups, this finding is important in differentiating between patterns of language performance measured by the PICA battery.

Some other trends which were observed in the responses to PICA subtest items are suggested as additional ways to differentiate between language pattern of schizophrenics and the brain-injured. Complex responses which are scored '16' are atypical of brain-injured subjects; however, complex responses were observed in many instances during the administration of the PICA to schizophrenics during this study. Complex '16' responses were recorded in numerous instances on Subtests I, III, IV, and A. It may be argued that while this kind of complex response may be atypical of aphasics, it is likely to be observed in the responses of normals as well as schizophrenics. There can be no denial that complex responses may be observed with both schizophrenics and normals; however, '16' type responses are accompanied by a number of other abnormal types of responses in schizophrenics which, when in combination with complex

responses, would be atypical of language patterns in normal subjects. Schizophrenic performance was characterized by delayed '13,' incomplete '12,' and incomplete-delayed '11' responses which indicated that some additional processing time was required or that the response was grammatically or syntactically incomplete, or a combination of both factors. The need to repeat instructions or provide cues, which are scored '9' and '8' respectively, before the production of an accurate response was observed frequently in schizophrenics. This seemed to indicate a problem of 'tuning in' or 'tuning out' during a subtest. These types of responses are probably the result of distractibility, inability to maintain a train of thought, impaired attention span, and other aspects of the symptomatology of schizophrenia that are discussed in Chapter I. Perseveration, neologisms, jargon, and unintelligible responses were observed in the verbal and graphic productions of the experimental group; however, these '5' and '4' types of responses were often accompanied by many complex '16' or complete '15' responses which is not typical of performance by brain-injured subjects. This language behavior in schizophrenia may be related to the desocialization process and impaired symbolization suggested by Arieti (1955).

Implications

It is evident to the author that there is implication for further research which would make possible a definitive differentiation between patterns of language performance of schizophrenics and brain-injured subjects. Further research studies might be designed which include the measures utilized in the present study and additional different tasks, such as conditions of varying contextual constraint and word fluency tests. There are also implications for further research with more severely impaired, institutionalized schizophrenic subjects.

Summary

The objective of the present research was to collect data on selected language performance in adult schizophrenic subjects and attempt to differentiate the pattern of language performance of this group from that of a group of subjects representing a range of communicative impairment which was the result of brain injury.

There were 23 schizophrenics in the experimental group and their performance was compared with the data reported by Porch (1967) for his sample of 150 aphasic patients which was used as the control group in the present study. The data for the control group were yielded by administration

of the Porch Index of Communicative Ability (PICA); whereas the tools utilized to measure performance in the experimental group were the PICA and the modified 40-item Token Test (LaPointe et al., 1971). Test stability was investigated by re-administering all phases of the testing measures during the second week after the initial test date.

The investigator attempted to answer three questions. First, are there significant differences between PICA overall means between the schizophrenic group and the brain-injured group? The results indicated that there was a significant difference between the two groups. Second, are there significant differences in the relationships between the PICA modality means of the experimental group and the control group? This question was answered by the finding that there was a reversal of the relationships of gestural and verbal modality means between the two groups. Third, are there significant differences in the hierarchy of PICA subtests between the two samples? Re-ordering of subtest hierarchy in terms of difficulty was found between the performance of schizophrenics and that of the aphasic group, particularly relative to the shifts in relationships among the PICA subtests.

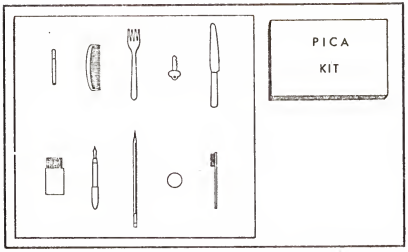
The data and findings resulting from the present study are considered to be meaningful contributions toward

the difficult task of differential diagnosis between communicative dysfunction due to brain damage, such as aphasia, and that which is observed in schizophrenia. The findings and conclusions are applicable to the performance of mildly to moderately impaired schizophrenic subjects and cannot be applied to severely impaired patients.

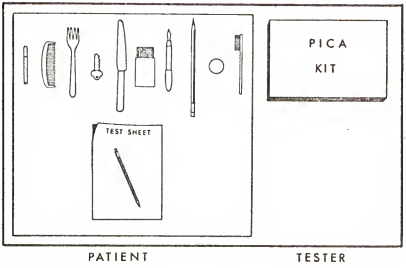
APPENDICES

APPENDIX A

TEST OBJECTS IN STANDARD POSITION



TEST OBJECTS ARRANGED FOR GRAPHIC TESTS



APPENDIX A (CONTINUED)

MULTIDIMENSIONAL SCORING CATEGORIES

Score	Level	Description
16	COMPLEX	Accurate, responsive, complex, immediate, elaborative response to test item.
15	COMPLETE	Accurate, responsive, complete, immediate response to test item.
14	DISTORTED	Accurate, responsive, complete response to test item, but with reduced facility or production.
13	COMPLETE-DELAYED	Accurate, responsive, complete response to the test item, which is significantly slow or delayed.
12	INCOMPLETE	Accurate, responsive, response to test item which is lacking in completeness.
11	INCOMPLETE-DELAYED	Accurate, responsive, incomplete response to test item which is significantly slowed or delayed.
10	CORRECTED	Accurate response to test item self-correcting a previous error without intervening variables.
9	REPETITION	Accurate response to test item after a repetition of the instructions by request or after a prolonged delay.
8	CUED	Accurate response to test item stimulated by a cue, additional information, or another test item.
7	RELATED	Inaccurate response to test item which is clearly related to or suggestive of an accurate response.
6	ERROR	Inaccurate response to the test item.

APPENDIX A (CONTINUED)

Score	Level	Description
5	INTELLIGIBLE	Intelligible response which is not associated with the test item, e.g., perseverative or automatic responses or an expressed indication of inability to respond.
4	UNINTELLIGIBLE	Unintelligible or incomprehensible response which can be differentiated from other responses.
3	MINIMAL	Unintelligible response which cannot be differentiated from other responses.
2	ATTENTION	Patient attends to test item but gives no responses.
1	NO RESPONSE	Patient exhibits no awareness of test item.

APPENDIX A (CONTINUED)

PORCH INDEX OF COMMUNICATIVE ABILITY
By Bruce E. Porch, Ph.D.
SCORE SHEET

Name _____ Case No. _____ Test No. _____

Date _____ By _____ Time _____ to _____ Total Time _____

Test Conditions _____

_____

Patient Conditions _____

_____

Time																		
Item	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A	B	C	D	E	F
1. Tb																		
2. Cg																		
3. Pn																		

4. Kf																	
5. Fk																	
6. Qt																	
7. Pl																	
8. Mt																	
9. Ky																	
10. Cb																	
Modality	VRB	GST	GST	VRB	GST	GST	GST	GST	VRB	GST	GST	VRB	GPH	GPH	GPH	GPH	GPH	GPH
Minutes																	
Mean Score																	

Response Levels:

Overall _____ Gestural _____ Verbal _____ Graphic__

Note: _____

APPENDIX B

TOKEN TEST
SPEECH PATHOLOGY
V. A. HOSPITAL
GAINESVILLE, FLA.

Name _____
Examiner _____
Date _____
Total Score _____
Total Time _____

Score	Time
	Part I
	Part II
	Part III
	Part IV
	Part V

I. Large tokens (order: rectangles, circles)

P	F	
		1. red circle
		2. yellow rectangle
		3. blue circle
		4. white circle
		5. green rectangle

II. All tokens (order: large circle, small circle, large, then small rectangle)

P	F	
		1. small white circle
		2. large blue rectangle
		3. small yellow rectangle
		4. large red circle
		5. small green circle

III. Large tokens (same as Part I)

P	F	
		1. white rectangle & blue rectangle
		2. red circle & green rectangle
		3. yellow circle & white circle
		4. red rectangle & blue rectangle
		5. red rectangle & green circle

IV. All tokens (same as Part II)

P	F	
		1. large red rectangle & large green circle
		2. large blue circle & small yellow circle
		3. small blue circle & large yellow rectangle
		4. large white circle & small green rectangle
		5. large white rectangle & small green circle

V. Large tokens (order: rectangles - green next to yellow; then the circles)

P	F	
		1. Put the red circle on the green rectangle.
		2. Put the white rectangle behind the yellow circle.
		3. Touch the blue circle with the red rectangle.

APPENDIX B (CONTINUED)

P	F	
		4. Touch - with the blue circle - the red rectangle._____
		5. Touch the blue circle and the red rectangle._____
		6. Pick up the blue circle or the red rectangle._____
		7. Put the green rectangle away from the yellow rectangle._
		8. Put the white circle before the blue rectangle._____
		9. If there is a black circle, pick up the red rectangle.__
		10. Pick up the rectangles, except the yellow one._____
		11. When I touch the green circle, you take the white rectangle._____
		12. Put the green rectangle beside the red circle._____
		13. Put the red circle between the yellow rectangle and the green rectangle._____
		14. Except for the green one, touch the circles._____
		15. Pick up the red circle - no! - the white rectangle._____
		16. Instead of the white rectangle, take the yellow circle._
		17. Together with the yellow circle, take the blue circle.__
		18. After picking up the green rectangle, touch the white circle._____
		19. Put the blue circle under the white rectangle._____
		20. Before touching the yellow circle, pick up the red rectangle._____

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BIOGRAPHICAL SKETCH

Geoffrey Hamilton Horsfall was born on August 25, 1932, in Radcliffe, England. In July, 1948, he completed his high school education at the Arnold School, Blackpool, England, and continued his studies in architecture and art at the Blackpool School of Arts. In January, 1950, he emigrated to the United States where he resided in Kilgore, Texas. In June, 1952, he married the former Alverne Johnson of Kilgore, Texas. He served in the United States Air Force from December, 1952, until July, 1966. In September, 1966, he enrolled as a junior-level undergraduate student at Texas Christian University, Fort Worth, Texas, to complete the degree requirements he had formerly pursued as a part-time student while serving in the Air Force. After moving to Dallas, Texas, he transferred to Southern Methodist University in January, 1967, where he majored in Speech Pathology and graduated in May, 1968. He was awarded the Master of Fine Arts degree in Audiology in August, 1969, by Southern Methodist University.

In September, 1969, he entered the Graduate School of the University of Florida, Gainesville, Florida,

where he began a program toward a doctorate in Speech Pathology and Audiology. During this period of study, he was awarded a Veterans Administration traineeship in Audiology and Speech Pathology at the Veterans Administration Hospital, Gainesville, Florida.

Geoffrey Hamilton Horsfall is a member of the American Speech and Hearing Association from which he holds the Certificate of Clinical Competence in Audiology; the Florida Speech and Hearing Association; and Sigma Alpha Eta, the speech and hearing honorary fraternity.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Thomas B. Abbott

Thomas B. Abbott, Chairman
Associate Professor of Speech

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Leonard L. LaPointe

Leonard L. LaPointe, Co-Chairman
Assistant Professor of Speech
(V.A. Hospital)

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

G. Paul Moore

G. Paul Moore
Professor of Speech

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Roy E. Tew
Professor of Speech

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Department of Speech in the College of Arts and Sciences and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1972

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